

REMARKS

This amendment is responsive to the Office Action of April 28, 2006. Reconsideration and allowance of **claims 1-15** are requested.

The Office Action

Claims 1, 8 and 10 stand rejected under 35 U.S.C. §102(b) as being anticipated by Takizawa (EP 0 909 958).

Claims 2-7 and 9 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Takizawa (EP 0 909 958) as applied to claim 1 and 8 above, and further in view of Stuber, Radiology Vol. 212:579-587; 1999.

The Present Application

The present application is directed to magnetic resonance. T2 weighted imaging relies upon local dephasing of spins following the application of the transverse energy pulse; T2 weighed sequences are typically used in a preparation stage during which the longitudinal magnetization is prepared according to the desired contrast.

Navigator signals are used for gating and motion correction in cardiac MR studies. Because in prior art T2 sequences disturbed the generation and registration of the navigator signal, according to the concepts of the present application, a restoring navigator sequence is applied before applying the actual navigator sequence.

For example, the T2 sequence includes at least two RF pulses which are separated by a relaxation period. The navigator restoring sequence can be applied during the T2 relaxation period, e.g. T2 and navigator restoring sequence can be applied simultaneously. A first restoring navigator pulse, for example, selectively transforms transverse magnetization generated by the T2 sequence within the navigator volume into longitudinal magnetization. At the end of the relaxation period, the longitudinal magnetization is again transformed into transverse magnetization by a second restoring navigator pulse so that it can be restored into the longitudinal magnetization by the non-selective tip-up pulse of the T2 sequence.

The References of Record

Takisawa is directed to motion correction in MRI. Takisawa generates a string of EPI echoes following each excitation. The first echo is designated as the navigator echo and the remaining echoes are used to reconstruct a fluoroscopic image or image update. The navigator echoes are used to correct motion related phase errors in the subsequent echoes of the corresponding EPI echo string.

Stuber is directed to MRI with navigator signal gating and correction. A T2 preparation sequence is applied, followed by a navigator excitation and post processing of the navigator data, the spectral selective fat-saturation pulse, and the segmented-k-space gradient-echo sequence.

The Claims Distinguish Patentably Over the References of Record

Claim 1 calls for among other elements: subjecting said portion to (1) a T2-preparation sequence, (2) a 2D navigator restore sequence, and (3) a navigator sequence. **Takisawa** generates a string of EPI echoes following each excitation. The first echo is designated as the navigator echo and the remaining echoes are used to reconstruct a fluoroscopic image or image update adjusted in accordance with the phase of the first or navigator echo. Takisawa does not describe generating and applying a T2 sequence and a navigator restore sequence which corrects the effects of the T2 sequence prior to the application of the actual navigator sequence so that the actual navigator sequence produces correct results. Therefore, it is respectfully submitted that **claim 1 and dependent claims 2-9** distinguish patentably and unobviously over Takisawa.

Claim 10 calls for among other elements: simultaneously with subjecting the portion of the object to the T2-preparation sequence, interleavingly subjecting the portion of the object to a 2D navigator restore sequence and the T2-preparation sequence. **Takisawa** generates a string of EPI echoes following each excitation. The first echo, which is designated as the navigator echo, provides a phase reference and the remaining echoes are used to reconstruct a fluoroscopic image or image update. Takisawa does not describe simultaneously with the applying a T2

sequence, applying a navigator restore sequence which corrects the effects of the T2 sequence prior to the application of the actual navigator sequence. Therefore, it is respectfully submitted that **claim 10** distinguishes patentably and unobviously over Takisawa.

New claims 11-15

New claims 11-15 have been added to claim more fully some aspects of the applicant's concepts. It is respectfully submitted that **claims 11-15** distinguish patentably and unobviously over Takisawa and Stuber, taken singularly or in combination.

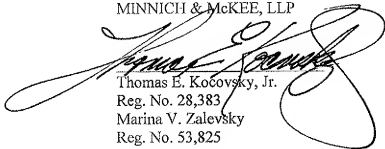
CONCLUSION

For the reasons set forth above, it is submitted that **claims 1-15** (all claims) distinguish patentably over the references of record and meet all statutory requirements. An early allowance of all claims is requested.

In the event the Examiner considers personal contact advantageous to the disposition of this case, he is requested to telephone Thomas Kocovsky at (216) 861-5582.

Respectfully submitted,

FAY, SHARPE, FAGAN,
MINNICH & McKEE, LLP

A large, stylized handwritten signature in black ink, which appears to read "Thomas E. Kocovsky, Jr.", is written over the typed name and address.

Thomas E. Kocovsky, Jr.
Reg. No. 28,383
Marina V. Zalevsky
Reg. No. 53,825
1100 Superior Avenue
Seventh Floor
Cleveland, OH 44114-2579
(216) 861-5582